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E2F FSK F540

(56) Documents Cited

GB 2018887 A EP 0066750 A DE 003701890 A
JP 010176462 A US 4772054 A

(58) Field of Search

UK CL (Edition Q) E2F, E2M
INT CL⁶ E05C, E05F
Online : WPI

(54) Abstract Title

Motor vehicle : door control

(57) To prevent damage to a pivoting door 12 of a motor vehicle, a sensor detects an obstruction in the opening or closing path of the door and actuates a door stop. Door stay 18 is pivoted to the bodywork and slides in door track 24. A gas strut 42 has its piston rod 46 connected to the sliding stay end 22. When the sensor, mounted e.g. on the door frame or a door accessory, detects an obstruction, it sends a signal to stop the lengthening of the gas strut and thus the door opening. Removal of the obstruction produces a second signal allowing strut to lengthen. The strut may be controlled by selectable valves. Alternatively, the stop may comprise a clamp acting on sliding stay end 22, or a clutch to selectively prevent stay movement. Stay end 22 may slide on the bodywork.

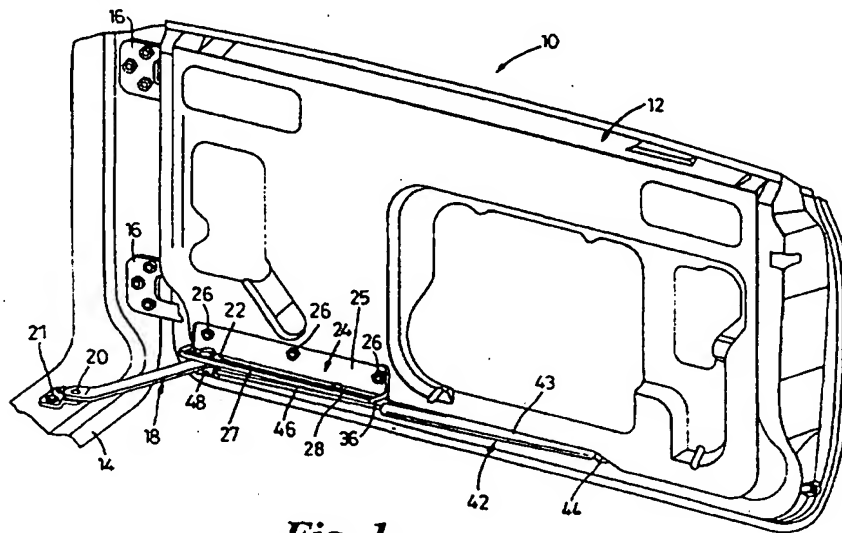


Fig. 1

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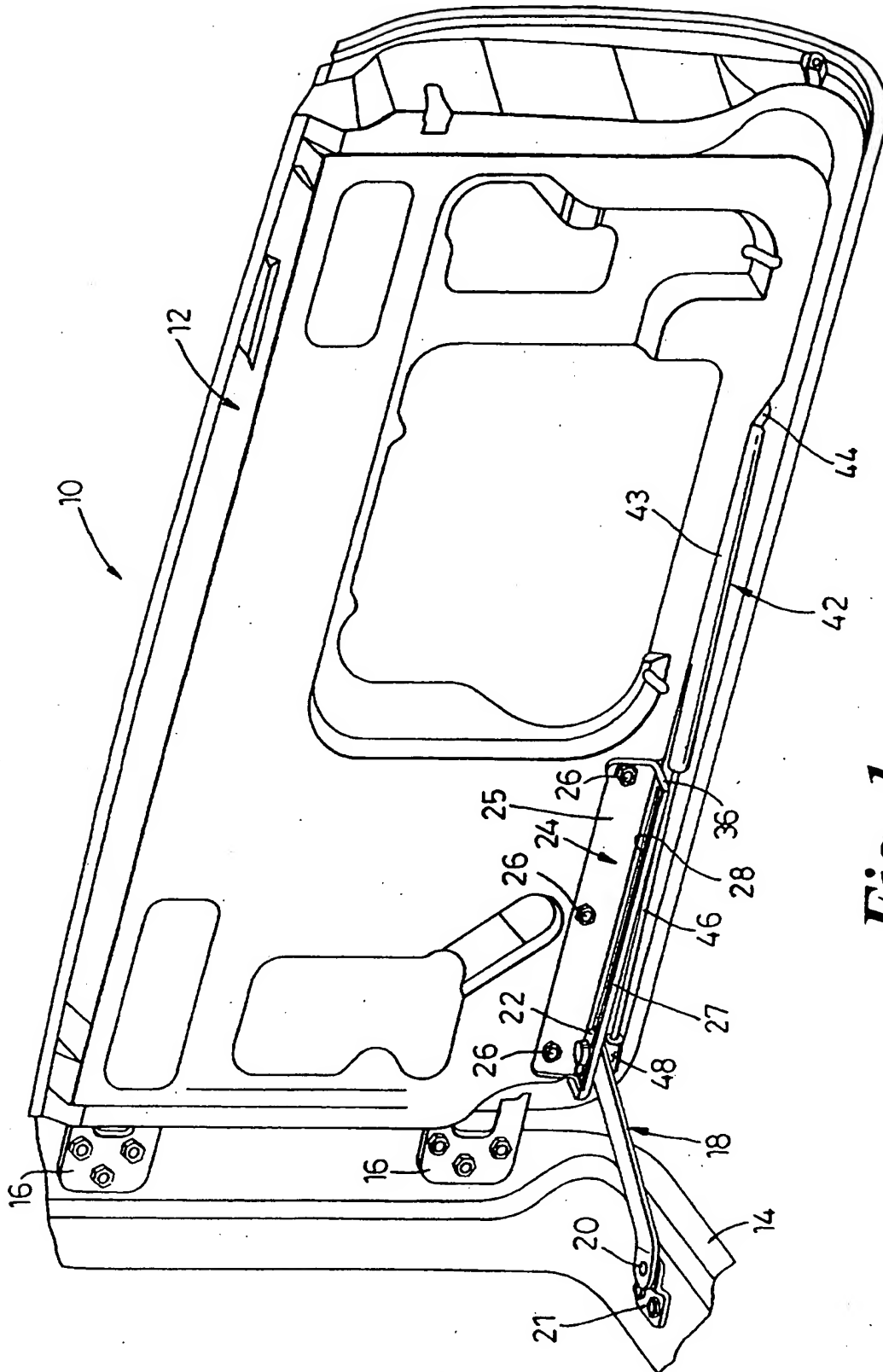


Fig. 1

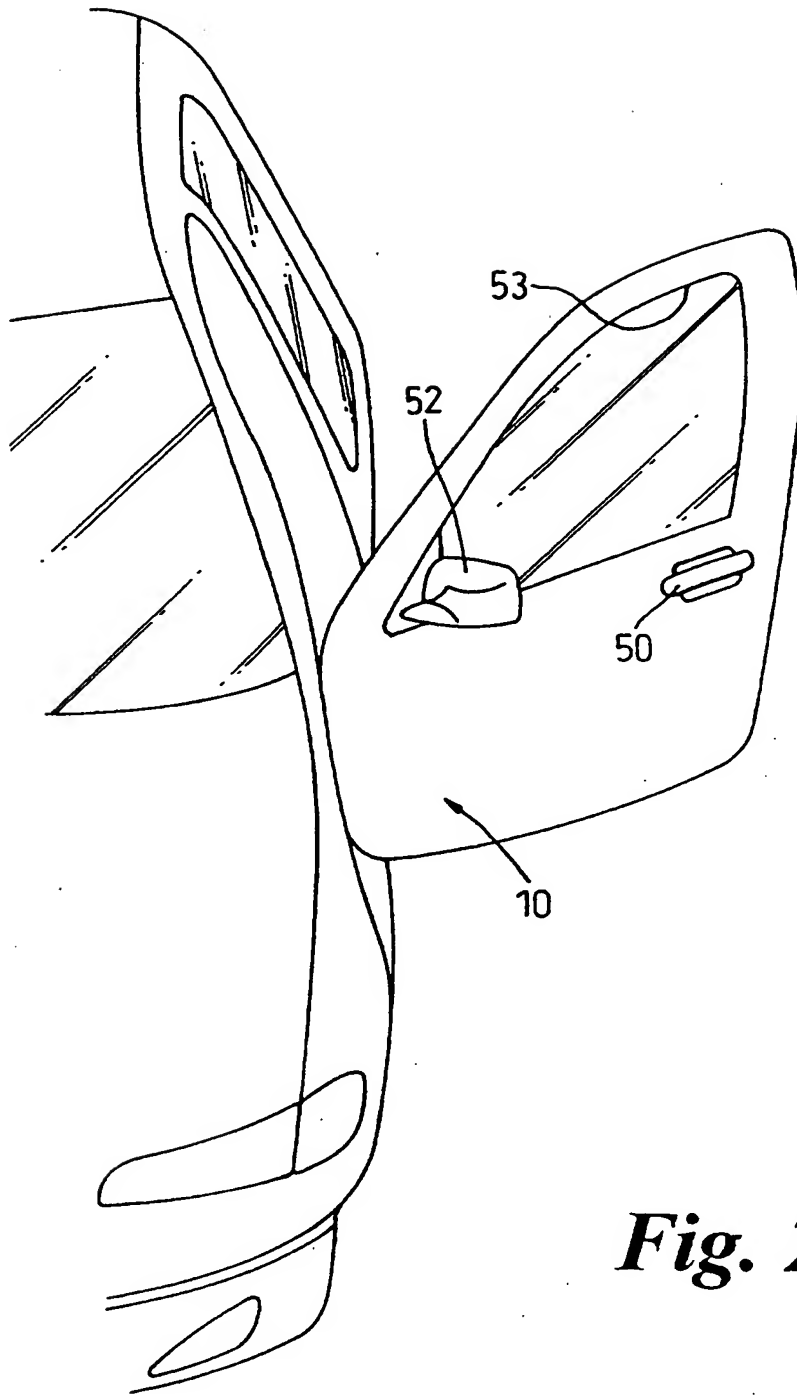


Fig. 2

MOTOR VEHICLE DOOR ASSEMBLY

The invention relates to a motor vehicle door assembly, and in particular to a hinged motor vehicle door assembly.

A vehicle door can often be damaged on opening by being swung into contact with another obstruction, for example a wall or lamppost. This may be due to carelessness on the part of the user, or ignorance, because the obstruction, such as a bollard cannot be seen, or easily seen, from within the vehicle. In any event, the vehicle door becomes damaged by being chipped, scratched, dented or otherwise. In order to return the vehicle to an "as new" condition, repair will need to be effected to the vehicle door. This is both time-consuming and expensive.

10 The present invention has as an advantage that the likelihood of damaging a motor vehicle door assembly in this way is eliminated or substantially reduced.

According to the invention there is provided a user operated motor vehicle door assembly comprises a door pivotally mounted on a body of a vehicle to move through a defined path and a door check means to limit opening of the door and to resist movement of the door, characterised in that the assembly further comprises sensor means to detect the presence of an obstruction in the path of the door and in that the door check means comprises a stay connected at a first end to one of the body and the door and having a second end slidably connected to the other of the body and the door and stop means to prevent a further movement of the door by a user, the stop means being actuated by the sensor detecting an obstruction in the path of the door.

Preferably, the sensor is a non-contact sensor.

Preferably the stop means comprises a hydraulic or pneumatic cylinder. Alternatively, the stop means comprises an electromechanical device such as a releasable clamp or a selectable clutch.

Preferably, means are provided to disable the stop means in the event of a crash.

- 5 The sensor is preferably mounted on the vehicle body beneath the door. Alternatively, the sensor is mounted in the door, for example on a door handle, a wing mirror or a window frame.

The invention will now be described by way of example only with reference to the accompanying drawings, in which:

- 10 Figure 1 shows a perspective view of a motor vehicle door assembly according to the present invention with the door open and an interior panel of the door removed; and

Figure 2 shows a perspective view of a motor vehicle for use with the vehicle door assembly of the present invention.

- Referring first to Figure 1, there is shown a door assembly 10 comprising a door 12
15 pivotally connected to a door frame forming part of a body of a motor vehicle by hinges 16. The door pivots about a generally vertical axis defined by the hinge connections between the door 12 and the frame 14.

- The door 12 is further connected to the frame 14 by door check means in the form of a stay 18. The stay is pivotally connected at a first end 20 to the frame by a bracket 21. A
20 second end 22 of the stay is slidably connected to the door by a track 24. The track 24 is in the form of a generally L-shaped bracket. A generally vertical part 25 of the bracket is provided with a plurality of apertures through which it may be connected to the door by bolts

26. Any other suitable means of connection may be used. A generally horizontal part 27 of the track is provided with a slot 28 in which the second end 22 of the stay may slide.

In the illustrated embodiment a gas strut 42 is provided connected between the second end of the stay and the door. The gas strut comprises a cylinder 43 and a piston rod 46. A
5 first end 44 of the gas strut is secured to the door 12. The piston rod 46 extends from the cylinder 43 and is connected at its free end 48 to the second end 22 to the stay 18 to move with the second end of the stay. As the door is opened, for example by a person located within the passenger cell, the length of the gas strut will increase to a maximum length corresponding to the door hinge

10 A sensor is provided to detect the presence of obstructions that would act to prevent the door opening freely. The sensor may be mounted in the door frame 14. Alternatively, the sensor may be mounted in the door assembly, for example, in a door handle assembly 50, a wing mirror assembly 52, a window frame 53 (Figure 2) or a rubbing strip.

Upon detecting an obstruction in the path of the door as it is being opened, a first signal
15 is sent to the gas strut 42 to prevent further lengthening of the gas strut. This in turn will prevent further opening of the door by the person opening the vehicle door. Once the obstruction has been removed, or has been moved, the sensor will fail to detect the obstruction. The sensor then sends a second signal to the gas strut to allow the gas strut to be lengthened and hence for the door to be opened by the person to a desired extent.

20 It will be understood that the present invention can also be adapted to detect the presence of obstructions, such as fingers or coat tails, in the path of the door as it is closed, by the suitable location of a sensor, to prevent such obstructions becoming trapped between the door and the vehicle body.

In a preferred embodiment, the gas strut is fitted with a selectable valve (not shown). In the event of an obstruction being detected on opening of the door the valve can be selected such that it will prevent lengthening of the strut, but allow shortening of the strut so that the door may be closed. Similarly, in the event of an obstruction being detected on closing of the door the valve can be selected such that it will prevent shortening of the strut, but allow lengthening of the strut so that the door may be opened further to allow removal of the obstruction.

In an alternative form of the embodiment (not shown) an electromechanical device such as a clamp may be provided to act on the second end 22 of the stay 18 and for the frame 14 to prevent movement of the second end of the stay upon detection of an obstruction in the path of the door. Such a clamp may be used in addition to or instead of the gas strut 42.

It will be understood that the gas strut and/or the electromechanical clamp will be enclosed between the door 12 and the inner trim attached to the door, but omitted from Figure 1. Such a location provides protection for the gas strut and/or the clamp.

In an alternative construction, the stop means takes the form of a selectable clutch mechanism to control the movement of the stay 22 and thus the movement of the door. Under normal operation, the clutch will allow the door to be both opened and closed. On detecting the presence of an obstruction in the path of the door as it is opened, the clutch will be selected to prevent further opening of the door. On detecting the presence of an obstruction in the path of the door as it is closed, the clutch may be selected to prevent further closing of the door.

CLAIMS

1. A user operated motor vehicle door assembly comprises a door pivotally mounted on a body of a vehicle to move through a defined path and a door check means to limit opening of the door and to resist movement of the door, characterised in that the assembly further comprises sensor means to detect the presence of an obstruction in the path of the door and in that the door check means comprises a stay connected at a first end to one of the body and the door and having a second end slidably connected to the other of the body and the door and stop means to prevent a further movement of the door by a user, the stop means being actuated by the sensor detecting an obstruction in the path of the door.
2. A motor vehicle door assembly according to claim 1, characterised in that the sensor is a non-contact sensor.
3. A motor vehicle door assembly according to either claim 1 or claim 2, characterised in that the stop means comprises a hydraulic or pneumatic cylinder.
4. A motor vehicle door assembly according to any of claims 1 to 3, characterised in that the stop means comprises an electromechanical device such as releasable clamp or a selectable clutch.
5. A motor vehicle door assembly according to any previous claim, characterised in that means are provided to disable the stop means in the event of a crash.
6. A motor vehicle door assembly according to any previous claim, characterised in that the sensor is preferably mounted on the body beneath the door.
7. A motor vehicle door assembly according to any of claims 1 to 5, characterised in that the sensor is mounted in the door.

8. A motor vehicle door assembly according to claim 7, characterised in that the sensor is mounted on a door handle, a wing mirror or a window frame.
9. A motor vehicle door assembly substantially as described herein with reference to and as illustrated in the accompanying drawings.



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Examiner: G R A H A M
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Claims searched: 1-9

Date of search: 30 November 1999

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Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK CI (Ed.Q): E2F, E2M.

Int CI (Ed.6): E05C, E05F.

Other: Online : WPI.

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
Y	GB 2018887 A (RENAULT) see e.g. vehicle door stay with end sliding in door track having door stop.	1.
Y	EP 0066750 A1 (NISSAN) see e.g. obstruction sensor controlling powered door movement.	1.
Y	US 4772054 (DAIMLER-BENZ) see e.g. vehicle door stay with end sliding in door track having stops.	1.
Y	DE 3701890 A (BOSCH) see e.g. abstract - sensors responding to obstruction by blocking feed line of door's servo cylinder.	1.
A	JP10176462 A (SUZUKI) - see e.g. Figs. 1-10 & abstract.	1.

X Document indicating lack of novelty or inventive step
Y Document indicating lack of inventive step if combined with one or more other documents of same category.
& Member of the same patent family

A Document indicating technological background and/or state of the art.
P Document published on or after the declared priority date but before the filing date of this invention.
E Patent document published on or after, but with priority date earlier than, the filing date of this application.